



Center
for
Risk Excellence



Tulane University
Medical Center

Project Screening Approach for the Office of Science and Technology Peer Review Program

Version 1.0

September 1999



Argonne National
Laboratory

**Prepared for the Office of Science and Technology
By the Center for Risk Excellence**



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Table of Contents

List of Tables	ii
List of Figures	iii
List of Acronyms	iv
Executive Summary	1
1.0 Introduction	3
2.0 Rationale for the Project Screening Approach	7
3.0 Project Integration Activities	9
3.1 Office of Science and Technology Interactions	9
3.2 External Interactions	11
4.0 Overview of the Project Screening Approach	13
5.0 Results	17
5.1 Deactivation and Decommissioning Focus Area	19
5.2 Mixed Waste Focus Area	27
5.3 Nuclear Materials Focus Area	49
5.4 Subsurface Contaminants Focus Area	49
5.5 Tanks Focus Area	71
6.0 References	93
Appendix	95

List of Tables

Table 5.1.1 Screening metrics for DDFA projects	20
Table 5.1.2 Projects for DDFA by investment score.....	21
Table 5.1.3 Projects for DDFA by relevance score	22
Table 5.1.4 Projects for DDFA by availability	23
Table 5.1.5 Projects for DDFA by highest gate achieved	24
Table 5.1.6 Projects for DDFA by number of years funded.....	25
Table 5.1.7 Projects for DDFA by ASME review status.....	26
Table 5.2.1 Screening metrics for MWFA projects	28
Table 5.2.2 Projects for MWFA by investment score	30
Table 5.2.3 Projects for MWFA by relevance score	33
Table 5.2.4 Projects for MWFA by availability	36
Table 5.2.5 Projects for MWFA by highest gate achieved.....	39
Table 5.2.6 Projects for MWFA by number of years funded	42
Table 5.2.7 Projects for MWFA by ASME review status	45
Table 5.4.1 Screening metrics for SCFA projects	50
Table 5.4.2 Projects for SCFA by investment score.....	53
Table 5.4.3 Projects for SCFA by relevance score	56
Table 5.4.4 Projects for SCFA by availability.....	59
Table 5.4.5 Projects for SCFA by highest gate achieved	62
Table 5.4.6 Projects for SCFA by number of years funded.....	65
Table 5.4.7 Projects for SCFA by ASME review status	68
Table 5.5.1 Screening metrics for TFA projects	72
Table 5.5.2 Projects for TFA by investment score	75
Table 5.5.3 Projects for TFA by relevance score	78
Table 5.5.4 Projects for TFA by availability	81
Table 5.5.5 Projects for TFA by highest gate achieved.....	84
Table 5.5.6 Projects for TFA by number of years funded	87
Table 5.5.7 Projects for TFA by ASME review status	90

List of Figures

Figure 1.1	Office of Science and Technology Peer Review Process	4
Figure 1.2	Project Screening Relationship to Peer Review	5
Figure 2.1	Why Project Screening is Needed	7
Figure 4.1	Process Flowchart for the Project Screening Approach	13

List of Acronyms

American Society of Mechanical Engineers	ASME
Argonne National Laboratory	ANL
Focus Areas	FA
Center for Risk Excellence	CRE
Characterization, Monitoring, and Sensor Technology	CMST
Composite Inflation Rate	CIR
Crosscutting programs	CC
Decontamination and Decommissioning Focus Area	DDFA
Efficient Separations	ESP
General Accounting Office	GAO
Industry/University Programs	INDP
Institute for Regulatory Science	RSI
Mixed Waste Focus Area	MWFA
National Research Council	NRC
Needs Management System	NMS
Nuclear Materials Focus Area	NMFA
Office of Science and Technology	OST
Research and Development	R&D
Robotics	RBX
Science and Technology	S&T
Subsurface Contaminants Focus Area	SCFA
Tanks Focus Area	TFA
Technology Management System	TMS
Tulane University Medical Center	TUMC
U.S. Department of Energy	DOE

Project Screening Approach for the Office of Science and Technology Peer Review Program

Executive Summary

The U.S. Department of Energy's (DOE) Office of Science and Technology (OST) develops technical solutions to environmental management problems at sites within the DOE nuclear weapons complex. OST's mission is to provide the full range of science and technology (S&T) resources and capabilities that are needed to improve or facilitate remediation and long-term stewardship. The technology development activities within OST, ranging from basic research to demonstration and deployment, are managed by five Focus Areas (FA), each specializing in a specific problem area, and four crosscutting programs (CC) that develop technologies applicable to one or more FA problem sets.

OST instituted a peer review program in FY1997 using the American Society of Mechanical Engineers (ASME) with administrative and technical support from the Institute of Regulatory Science (RSI), to provide the FA and CC program managers with credible, independent evaluations of the scientific and technical merit of its technology projects. In a recent report, the National Research Council (NRC) noted improvements in OST's peer review procedures but also noted that a large "backlog" of OST projects have not been peer reviewed. The NRC committee recommended that OST implement a formal screening of projects prior to extensive peer review to support the identification of those projects that should receive a more detailed external evaluation.

OST senior management assigned the responsibility for designing and implementing a project screening approach to support OST's peer review process to DOE's Center for Risk Excellence (CRE), whose director is the Peer Review Coordinator. Under the direction of the Peer Review Coordinator, a team consisting of personnel from CRE, Tulane University Medical Center (TUMC) and Argonne National Laboratory (ANL) was formed and began its effort in late FY 1999. The initial application of the project screening approach concentrates on active technology projects managed by the Focus Areas.

Applying screening for peer review to OST projects requires the recognition of priority needs within DOE by Focus Area and consistent screening of projects for each FA. The project screening approach has three primary objectives:

- Screen projects to support FA managers' identification of projects for peer review
- Characterize, manage, and reduce the "backlog" of projects for peer review
- Verify project documentation contained in OST management information systems

Implementing the project screening approach is an iterative process involving a series of steps, including periodic interaction with senior OST personnel at DOE Headquarters and the Focus Area managers

The project screening approach was developed to assist in the identification of projects that will be selected by the individual FA's for peer review. The approach provides consistent, documentable screening of projects for each Focus Area. The approach uses information in existing OST management information system—the Technology Management System (TMS) and the Needs Management System (NMS)—for scoring projects on three metrics—investment, relevance, and availability. Investment indicates the level of financial commitment by DOE through FY 1999 expressed in constant 1999 dollars. Relevance indicates the ability of an individual project to address the needs identified by the sites for the specific Focus Areas. Availability indicates the schedule compatibility of an individual project within the timeframe for deployment at sites in the DOE complex.

The project screening approach began with all of the FY99-funded technologies in the Technology Management System (TMS). Initially, 238 projects were identified in the TMS database. After the initial pre-screening, 79 projects were identified as being active technology projects directly under one of the FAs with documented needs. All active technology projects that could be related to a FA through a work package were included in the FY 1999 project screening. Nuclear Materials Focus Area (NMFA) projects were excluded because FY 2001 will be the first fiscal year of full operations.

The results from the pilot application to support selection of projects for peer review in the FY 2000 cycle are organized by FA. Individual projects are identified by OST Tech ID and OST Tech Title. The results are presented in a series of tables where projects are scored on the metrics and are sorted by the following items:

- | | |
|----------------|----------------------|
| ▪ OST Tech ID | ▪ Gate Status |
| ▪ Investment | ▪ Years Funded |
| ▪ Relevance | ▪ Peer Review Status |
| ▪ Availability | |

These results from the project screening approach will be used to support FA managers' recommendations of projects for peer review in the FY 2000 peer review cycle.

Project Screening Approach for the Office of Science and Technology Peer Review Program

1.0 Introduction

The U.S. Department of Energy's (DOE) Office of Science and Technology (OST) develops technical solutions to environmental management problems at sites within the DOE nuclear weapons complex. OST's mission is to provide the full range of science and technology (S&T) resources and capabilities that are needed to improve or facilitate remediation and long-term stewardship. The technology development activities within OST, ranging from basic research to demonstration and deployment, are managed by five Focus Areas (FA), each specializing in a specific problem area, and four crosscutting programs (CC) that develop technologies applicable to one or more FA problem sets. The FAs are Decontamination and Decommissioning (DDFA), Mixed Waste (MWFA), Nuclear Materials (NMFA), Subsurface Contaminants (SCFA), and Tanks (TFA). The crosscutting programs are Characterization, Monitoring, and Sensor Technology (CMST), Efficient Separations (ESP), Industry/University Programs (INDP), and Robotics (RBX).

Annually, OST requests funding for projects that the FAs and crosscuts plan to conduct. These projects are chosen for continuation or initiation based on a technology selection process that uses the results of a variety of reviews. Several National Research Council (NRC) and General Accounting Office (GAO) reports have evaluated OST's project selection process. Both the NRC and GAO have recommended that an independent, external peer review be included as part of the overall technology development selection process (NRC 1996, 1995a, 1995b; GAO 1996).

In response to these recommendations, OST instituted a peer review program in 1997. OST's peer review program is intended to provide the Focus Area and crosscutting program managers with credible, independent evaluations of the scientific and technical merit of technology projects. Figure 1.1 illustrates OST's peer review process which uses the American Society of Mechanical Engineers (ASME), with administrative and technical support from the Institute for Regulatory Science (RSI), to conduct peer reviews of projects recommended by the FA and CC managers (DOE 1998). DOE's Center for Risk Excellence (CRE) is responsible for scheduling and coordinating the peer review effort. The ASME peer reviews typically focus on individual projects. ASME's peer reviews potentially provide OST with an effective tool for generating high-quality information that can serve as an input for improving the ongoing research effort and making decisions about allocating and prioritizing resources within its research and development (R&D) portfolio.



Figure 1.1 Office of Science and Technology Peer Review Process

In a recent report, the NRC noted that there have been marked improvements in the procedures for conducting peer reviews of OST projects since FY 1997. However, the committee also noted that a large “backlog” of OST projects have never been subjected to peer review (NRC 1998). As a result, the NRC committee recommended that OST consider implementing a formal prescreening of projects prior to extensive peer review. The objective of the prescreening would be to allow OST program managers to identify those projects that should receive a more detailed external evaluation, including presentations by the project team and question-and-answer sessions.

The senior management of OST assigned the responsibility for designing and implementing a project screening approach to support OST’s peer review process to DOE’s Center for Risk Excellence, whose director functions as the Peer Review Coordinator. Under the direction of the Peer Review Coordinator, a team consisting of personnel from CRE, Tulane University Medical Center (TUMC), and Argonne National Laboratory (ANL) was formed and began its effort in late FY1999. The initial application of the project screening approach concentrates on active technology projects managed by the Focus Areas. The output from the project screening approach will be used to support FA managers’ recommendations of projects for peer review in the FY 2000 peer review cycle.

Adoption of the project screening approach will allow OST to focus its peer review assets, especially important under conditions of constrained funding and time, on those projects within its R&D portfolio that might benefit most from an independent, external review by technical experts. The project screening approach provides a consistent appraisal of OST technology projects. The output generated by the project screening approach supports FA managers’ identification of new or continuing active projects that maximize benefits from the application of limited peer review resources. The screening approach integrates information about project status into the overall peer review process while maintaining existing responsibilities. Figure 1.2 illustrates the relationship of project screening to OST’s peer review program.

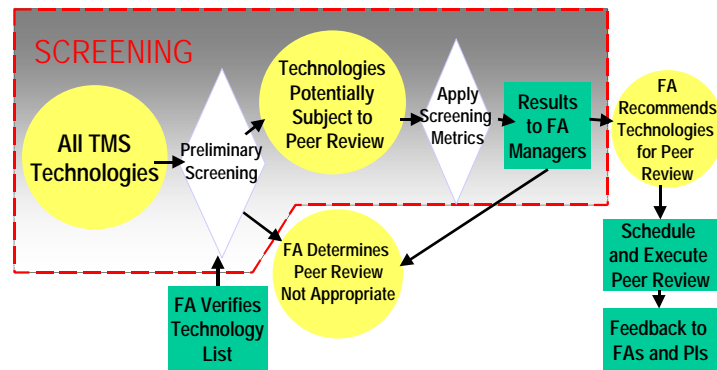


Figure 1.2 Project Screening Relationship to Peer Review

Applying screening for peer review to OST projects requires the recognition of priority needs within DOE by Focus Area. It also requires consistent screening of projects for each FA. The project screening approach has three primary objectives:

- Screen projects to support FA managers' identification of projects for peer review
- Characterize, manage, and reduce the "backlog" of projects for peer review
- Verify project documentation contained in OST management information systems

Implementing the project screening approach is an iterative process involving a series of steps, including periodic interaction with senior OST personnel at DOE Headquarters and the Focus Area managers. A list of all technology projects arrayed by FA is generated from OST's Technology Management System (TMS). The FA managers are responsible for verifying those projects that currently are active within their FA in order to identify the "pool" of projects for the screening process. Incorporating this preliminary screening into the project screening approach characterizes and reduces the perceived "backlog" of projects for peer review because inactive or non-technology projects are not appropriate candidates for peer review. A set of metrics for screening active projects based on information in the TMS and OST's Needs Management System (NMS) is developed in parallel to generation of the verified list of active technology projects. All active technology projects within a FA are then scored and ranked on three metrics – investment, relevance, and availability – that are used to screen projects to support FA managers' identification of candidates for peer review. This report describes the project screening approach applied to OST's technology projects that were funded by the FAs in FY1999 for which site-specific needs have been documented and provides the scores on the metrics for individual projects sorted by Focus Area.

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2.0 Rationale for the Project Screening Approach

The approach summarized in this report provides consistent screening of OST technology projects to support Focus Area managers' identification of projects for peer review that maximize benefits from the application of limited peer review resources. While OST has initiated a number of actions to enhance the value of its external reviews, Figure 2.1 offers clear evidence of why the NRC and GAO have concluded that screening of technology projects is needed.

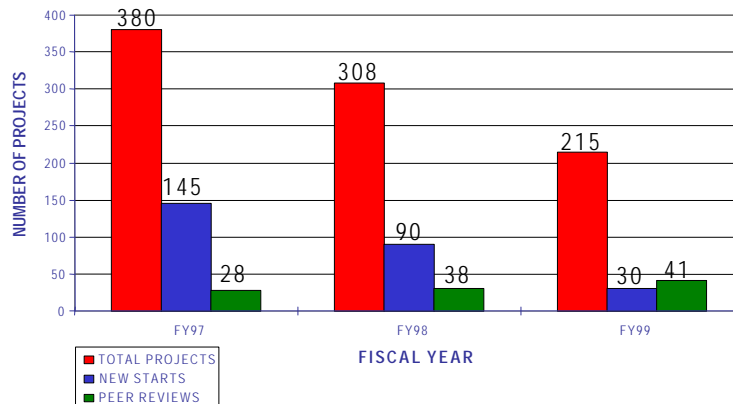


Figure 2.1 Why Project Screening is Needed

The data in Figure 2.1, which are derived from the TMS, demonstrate that it is not realistic to assume that all of OST's projects can be peer reviewed within a reasonable timeframe given available resources. As a result, the conventional wisdom assumes the existence of a substantial "backlog" of projects for peer review. The magnitude of the "backlog", however, is not necessarily the difference between the total number of projects and the target number for peer reviews. All OST projects do not necessarily require a detailed external evaluation, which include presentations by the project team and question-and-answer sessions, using the ASME format. Other projects may be better suited for internal programmatic or other technical reviews. The project screening approach can assist OST managers in selecting projects that would benefit most from an independent peer review. As a result, the actual "backlog" would be the difference between the total number of projects for which peer review is theoretically appropriate and the target number for peer reviews. Systematically applying project screening to OST projects fosters identification of the actual "backlog" and helps identify those projects that should receive a priority in terms of scheduling peer review.

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3.0 Project Integration Activities

The CRE team initiated a series of activities to ensure that the project screening approach meets OST's needs and is analytically credible. A process for continuous interaction with the FA managers and DOE Headquarters was established. The CRE team also provided briefings to the ASME during the project. In addition, the methodology for the project screening approach was subjected to an independent, technical peer review.

3.1 Office of Science and Technology Interactions

The ability of the project screening approach to support selection of OST technologies for peer review requires continuous interaction with senior OST personnel and the Focus Area managers. The CRE team maintained a working relationship with both groups through a combination of briefings, weekly conference calls, and site visits. Without such ongoing, intensive interaction, it would be impossible to design and apply a project screening approach for OST projects that recognizes priority needs within DOE by FAs.

At the start of the project in May 1999, the CRE team briefed senior OST personnel at DOE Headquarters on a preliminary design for the project screening approach. The briefing resulted in providing guidance on the following:

- Scope of the pilot application of the project screening approach
- Nature of the interactions with the Focus Areas
- Potential information sources for project screening metrics
- Anticipated role of project screening in relation to the peer review process and other OST technical and programmatic reviews

The guidance received from this briefing became the basis for developing the scope and objectives incorporated into the work plan for the pilot application of the project screening approach.

In July, an overview of the project screening approach, including information sources and metrics, was presented to the FA managers and other related OST staff. A tentative schedule for site visits was discussed and modified to accommodate existing planning requirements of the Focus Areas. The division of responsibility between the Focus Areas and CRE for implementing the project screening approach also was defined.

The Focus Area managers have a weekly conference call to discuss common issues relating to schedules, deliverables, planning, and reporting. Once the project screening project was initiated, the CRE team participated in the weekly conference calls starting in late July. Subsequent conference calls were used to update OST staff at DOE

Headquarters and the FA managers on progress, identify and resolve common issues, and schedule additional face-to-face interactions.

The CRE team made site visits to meet with the Focus Area managers in order to explain in detail the project screening approach and to receive input from the Focus Areas on how project screening could best help the identification of technology projects for peer review. The schedule of site visits for the Focus Area interactions is listed below:

FOCUS AREA	LOCATION	DATE
Subsurface Contamination Focus Area	Savannah River	August 17
Tanks Focus Area	Richland	August 23
Mixed Waste Focus Area	Idaho Falls	August 24
Nuclear Materials Focus Area	Idaho Falls	August 24

Each Focus Area had specific questions about the project screening approach. However, the dialogue between the CRE team and FA managers emphasized discussion of possible additional uses of the information generated by the project screening approach, the FA decision making responsibility, the quality and completeness of the information sources, the level of information being used for generating the metrics, the types of activities to be included and excluded from the project screening and the peer review process, the schedule and timing, and the relationship to ongoing review activities. The discussions with the Focus Area managers provided valuable insights into the details of executing the project screening approach in relationship to other FA activities. These discussions also confirmed the need for project screening and provided an opportunity for the FA managers to clarify what they considered to be appropriate for inclusion in the project screening approach and peer review process.

Prior to the meetings, preliminary lists of technologies included in the TMS funding profile for each Focus Area were sent to the FA managers for their review. The purpose of their review was to identify those projects that were appropriate for peer review in order to establish the “pool” of projects for inclusion in the project screening process. The final “pool” consisted of those active technology projects funded in FY 1999 for which site-specific needs have been documented. Only those projects remaining on the list after this initial prescreening were subject to scoring on the project screening metrics.

In late September, after generating scores on the metrics for the individual projects in each FA, meetings were held with the managers of three Focus Areas to review the output. The follow-up meetings were used to discuss the preliminary results with the Focus Area managers, ensure data accuracy, and clarify any questions regarding the source of the information used or the means of summarizing the data for presentation. Meetings with the Focus Area managers were held on the following schedule:

FOCUS AREA	LOCATION	DATE
Subsurface Contamination Focus Area	Atlanta	September 20
Tanks Focus Area	Video Conference	September 22
Mixed Waste Focus Area	Video Conference	September 22

A final briefing summarizing the results of the triage application will be presented at DOE Headquarters in early FY 2000.

3.2 External Interactions

In late July, the CRE team presented an overview of the project screening approach, including information sources and metrics, to ASME and RSI. In late September, after generating scores on the metrics for the individual projects in each FA, a follow-up meeting was held with ASME and RSI. The second briefing provided an overview of the role of the project screening approach in the selection of projects for peer review in FY 2000, the source of the information used, and the methods for summarizing the data.

The conceptual design and metrics utilized for the project screening approach were subjected to external review in mid-September by an independent science advisory committee. Members of the committee possess expertise in nuclear physics, environmental engineering, risk assessment, occupational health and safety, environmental medicine, and environmental management:

- Evgeny N. Avrorin, Ph.D., Scientific Director, Russian Federal Nuclear Center, All-Russian Institute of Technical Physics
- Colonel Patrick Fink, P.E., Chief, Environmental Division, US Air Force Education and Training Command
- Timothy A. Hall, Ph.D., President, ManTech Environmental Corporation and ManTech Environmental Technology, Inc.
- Glenn Paulson, Ph.D., President, Paulson and Cooper, Inc.
- Oles A. Pyatak, M.D., Ph.D., Deputy Director General, Research Center for Radiation Medicine, Academy of Medical Sciences of Ukraine
- Myron F. Uman, Ph.D., Associate Executive Officer, National Research Council
- Chris Whipple, Ph.D., Vice President, ICF Consulting

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4.0 Overview of the Project Screening Approach

Project screening supports optimizing the allocation of a limited resource. In the case of OST's R&D portfolio, there are many more projects that might be peer reviewed every year than there are available peer review resources. As a result, the project screening approach was developed to assist in the identification of projects that will be selected by the individual FA's for peer review. The approach provides consistent, documentable screening of projects for each Focus Area. The approach as depicted in Figure 4.1, uses quantifiable indicators based on information in existing OST databases to assemble, synthesize, and communicate information to support ASME's peer review of environmental technology projects.

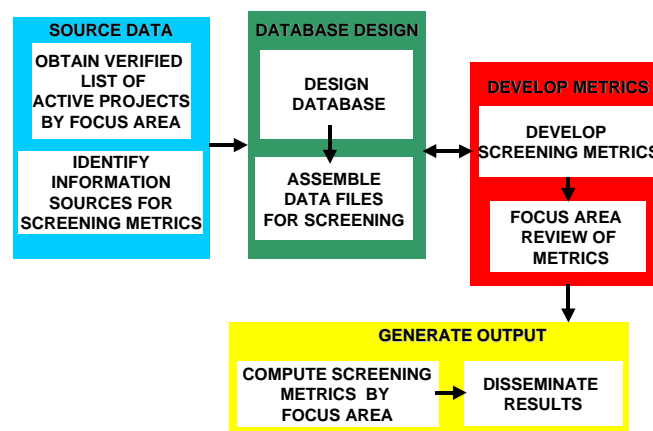


Figure 4.1 Process Flowchart for the Project Screening Approach

Data from existing OST management information systems—the TMS and the NMS—are used to generate scores for individual projects by Focus Area. The two databases define the research projects identified as being part of each Focus Area's program and the technology needs identified by the sites within the DOE nuclear weapons complex. The TMS contains individual project "Technology Overviews" which provide descriptive, maturity, funding, benefit, and application information. The NMS provides information about the timing and priority on a site-specific basis for technical solutions that support environmental remediation or long-term-stewardship requirements. The resulting database for the application of the project screening approach was developed by both converting data sheets downloaded from the two systems to a DBF format using Access97 and manually entering other required data. Seven database tables were created that contained information on an individual project basis:

- Technology Projects (Tech ID, Tech Title, Tech Sponsor, Tech Focus Area, Tech Gate)

- Work Package Information (Work Package ID, Work Package Title)
- Technology Needs (Tech ID, associated Need ID)
- Need (Need ID, Early Need Date, Late Need Date, Priority)
- Funding (Tech ID, Source ID, Fiscal Year)
- Composite Inflation Rate (Fiscal Year, Composite Inflation Rate (CIR))
- Funding Source

Tables were related (“linked”) to each other by the Tech ID and/or the Need ID, depending on the nature of the database construction or project scoring requirements.

The project screening approach uses three metrics—investment, relevance, and availability—to assess individual projects. Investment indicates the level of financial commitment by DOE through FY 1999 expressed in constant 1999 dollars. Relevance indicates the ability of an individual project to address the needs identified by the sites for the specific Focus Areas. Availability indicates the schedule compatibility of an individual project within the timeframe for deployment at sites in the DOE complex.

Investment data are obtained from the TMS. Scores for each project are computed using the following equation:

$$F_t = \sum_{1989}^{1999} F_n \text{CIR}_n$$

Where:

F_t = Total Doe funding (constant 1999 dollars)
 F_n = DOE funding in FY-n (current year dollars)
 CIR_n = Composite inflation rate for Yr-n (based on CPI-Urban, 1984-00)

By using constant 1999 dollars, the investment score reflects the overall level of funding adjusted for inflation since the project was initiated. Calculating the investment score for each project permits comparisons of the magnitude of DOE’s financial commitment across projects within a Focus Area.

The relevance index is computed using the following equation:

$$R_t = \left[\frac{3N_{t1} + 2N_{t2} + N_{t3}}{3N_{fa1} + 2N_{fa2} + N_{fa3}} \right] \times 100$$

Where:

R_t = % relevance of technology project
 N_{tm} = # of needs a technology addresses by priority, n
 N_{fan} = total # of needs identified for a focus area by priority, n

The resulting score for a project allows each group of projects within a FA to be evaluated based on their contribution towards meeting site-identified priorities for technical solutions. The absolute values of this indicator can range from zero to 100. Data to compute scores on the relevance index are derived from the NMS.

Availability provides a measure of schedule status. Projects are scored based on a comparison of the site needs schedule and technology status using the following categories:

**Calculate by comparing needs schedule
and technology availability status:**

Where:

5 = available on or before earliest needs date

4 = available after earliest but on or before latest needs date

3 = indeterminate, only needs dates known

2 = indeterminate, only technology availability known

1 = indeterminate, needs dates and technology availability unknown

The earliest and latest dates associated with a group of needs represent a “window of opportunity” for a technical solution to impact problems within the complex. Conversely, if a technology is not available prior to the latest needs date, the project is unable to contribute significantly to problem solving. Data for the availability score are derived by comparing information in the NMS for needs dates and the TMS for project schedule status.

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5.0 Results

This section provides the results obtained from the pilot application of the project screening approach to support selection of projects for peer review in the FY 2000 cycle. Initially, 238 projects were identified in the TMS database as of July 31, 1999. After the initial preliminary screening, 123 projects were identified as being active technology projects directly under one of the FAs. All active technology projects that could be related to a FA through a work package to document site-specific needs were included in the FY 1999 project screening. As a result, the pilot application of the project screening approach generated scores for 79 active technology projects managed by the DDFA, MWFA, SCFA, or TFA in FY 1999. NMFA projects were excluded because FY 2001 will be the first fiscal year that it will be fully operational, although one of its three active projects in FY 1999 was peer reviewed in late June 1999.

Individual sections are also provided for each FA. Individual projects are identified by OST Tech ID and OST Tech Title. The first table in each section provides the scores and rankings for all projects within the FA. The second table ranks projects based on investment. The third table ranks projects based on relevance. The fourth table ranks projects based on availability. The fifth table sorts projects by gate status (i.e., the highest gate achieved). The sixth table sorts by the number of years that the project has been funded by DOE. The seventh table sorts projects based on prior ASME peer review status.

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5.1 Deactivation and Decommissioning Focus Area

The Deactivation and Decommissioning Focus Area provides new or improved technologies to deactivate 7,000 contaminated buildings and decommission 700 buildings. It emphasizes large-scale demonstrations, which incorporate improved technologies identified as being responsive to high-priority needs. Each of the technologies selected for demonstration can be either purchased commercially or can be procured from a point-of-contact. None of these technologies were developed by the DDFA.

Individual projects are identified by OST Tech ID and OST Tech Title. Table 5.1.1 in each section provides the scores and rankings for all projects within the FA. Table 5.1.2 ranks projects based on investment. Table 5.1.3 ranks projects based on relevance. Table 5.1.4 ranks projects based on availability. Table 5.1.5 sorts projects by gate status (i.e., the highest gate achieved). Table 5.1.6 sorts by the number of years that the project has been funded by DOE. And Table 5.1.7 sorts projects based on prior ASME peer review status.

Table 5.1.1 Screening metrics for DDFA projects

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2310	Direct Reading Tritium Monitor	\$100,000	3	1	0.7	4	2	6	0	
2311	Portable Scintillation Counter	\$54,500	7	1	0.7	4	2	6	0	
2312	Water Solidification	\$77,000	4	1	0.7	4	2	6	0	
2314	Strippable Coatings and Fixatives	\$76,000	5	1	12.2	1	5	6	0	
2315	Electret Ion Chambers	\$56,000	6	1	3.4	3	2	5	0	
2330	Drum Bubbler for Tritium	\$11,007,909	1	7	0.7	4	6	6	0	
955	Laser Decontamination and Recycle of Metals	\$777,769	2	5	12.2	1	3	3	0	

Table 5.1.2 Projects for DDFA by investment score

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2330	Drum Bubbler for Tritium	\$11,007,909	1	7	0.7	4	2	6	0	
955	Laser Decontamination and Recycle of Metals	\$777,769	2	5	12.2	1	3	3	0	
2310	Direct Reading Tritium Monitor	\$100,000	3	1	0.7	4	2	6	0	
2312	Water Solidification	\$77,000	4	1	0.7	4	2	6	0	
2314	Strippable Coatings and Fixatives	\$76,000	5	1	12.2	1	5	6	0	
2315	Electret Ion Chambers	\$56,000	6	1	3.4	3	2	5	0	
2311	Portable Scintillation Counter	\$54,500	7	1	0.7	4	2	6	0	

Table 5.1.3 Projects for DDFA by relevance score

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
955	Laser Decontamination and Recycle of Metals	12.2	1	\$777,769	2	5	3	3	0	
2314	Strippable Coatings and Fixatives	12.2	1	\$76,000	5	1	5	6	0	
2315	Electret Ion Chambers	3.4	3	\$56,000	6	1	2	5	0	
2330	Drum Bubbler for Tritium	0.7	4	\$11,007,909	1	7	2	6	0	
2310	Direct Reading Tritium Monitor	0.7	4	\$100,000	3	1	2	6	0	
2312	Water Solidification	0.7	4	\$77,000	4	1	2	6	0	
2311	Portable Scintillation Counter	0.7	4	\$54,500	7	1	2	6	0	

Table 5.1.4 Projects for DDFA by availability

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
2314	Strippable Coatings and Fixatives	5	\$76,000	5	1	12.2	1	6	0	
955	Laser Decontamination and Recycle of Metals	3	\$777,769	2	5	12.2	1	3	0	
2310	Direct Reading Tritium Monitor	2	\$100,000	3	1	0.7	4	6	0	
2315	Electret Ion Chambers	2	\$56,000	6	1	3.4	3	5	0	
2311	Portable Scintillation Counter	2	\$54,500	7	1	0.7	4	2	0	
2312	Water Solidification	6	\$77,000	4	1	0.7	4	6	0	
2330	Drum Bubbler for Tritium	2	\$11,007,909	1	7	0.7	4	6	0	

Table 5.1.5 Projects for DDFA by highest gate achieved

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
2310	Direct Reading Tritium Monitor	6	\$100,000	3	1	0.7	4	2	0	
2311	Portable Scintillation Counter	6	\$54,500	7	1	0.7	4	2	0	
2312	Water Solidification	6	\$77,000	4	1	0.7	4	2	0	
2314	Strippable Coatings and Fixatives	6	\$76,000	5	1	12.2	1	5	0	
2330	Drum Bubbler for Tritium	6	\$11,007,909	1	7	0.7	4	2	0	
2315	Electret Ion Chambers	5	\$56,000	6	1	3.4	3	2	0	
955	Laser Decontamination and Recycle of Metals	3	\$777,769	2	5	12.2	1	3	0	

Table 5.1.6 Projects for DDFA by number of years funded

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2330	Drum Bubbler for Tritium	7	\$11,007,909	1	0.7	4	2	6	0	
955	Laser Decontamination and Recycle of Metals	5	\$777,769	2	12.2	1	3	3	0	
2310	Direct Reading Tritium Monitor	1	\$100,000	3	0.7	4	2	6	0	
2312	Water Solidification	1	\$77,000	4	0.7	4	2	6	0	
2314	Strippable Coatings and Fixatives	1	\$76,000	5	12.2	1	5	6	0	
2315	Electret Ion Chambers	1	\$56,000	6	3.4	3	2	5	0	
2311	Portable Scintillation Counter	1	\$54,500	7	0.7	4	2	6	0	

Table 5.1.7 Projects for DDFA by ASME review status

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
2310	Direct Reading Tritium Monitor	0		\$100,000	3	1	0.7	4	2	6
2311	Portable Scintillation Counter	0		\$54,500	7	1	0.7	4	2	6
2312	Water Solidification	0		\$77,000	4	1	0.7	4	2	6
2314	Strippable Coatings and Fixatives	0		\$76,000	5	1	12.2	1	5	6
2315	Electret Ion Chambers	0		\$56,000	6	1	3.4	3	2	5
2330	Drum Bubbler for Tritium	0		\$11,007,909	1	7	0.7	4	2	6
955	Laser Decontamination and Recycle of Metals	0		\$777,769	2	5	12.2	1	3	3

5.2 Mixed Waste Focus Area

The Mixed Waste Focus Area provides new or improved treatment systems for mixed radioactive and hazardous chemical waste, and processes for the disposal of low-level and transuranic waste in a manner that meets regulatory requirements. Emphasis is placed on developing cost-effective monitoring systems, waste volume reduction, and safe permanent disposal.

Individual projects are identified by OST Tech ID and OST Tech Title. Table 5.2.1 in each section provides the scores and rankings for all projects within the FA. Table 5.2.2 ranks projects based on investment. Table 5.2.3 ranks projects based on relevance. Table 5.2.4 ranks projects based on availability. Table 5.2.5 sorts projects by gate status (i.e., the highest gate achieved). Table 5.2.6 sorts by the number of years that the project has been funded by DOE. And Table 5.2.7 sorts projects based on prior ASME peer review status.

Table 5.2.1 Screening metrics for MWFA projects

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	\$4,267,439	1	7	1.5	10	5	6	1	1997
1619	MIT Multi-Metal Emission Monitor	\$1,906,993	3	3	0.6	19	5	4	1	1998
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	\$1,713,687	5	3	2.9	4	5	4	1	1999
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	\$1,978,649	2	2	1.7	9	5	5	0	
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	\$354,669	17	2	2.5	6	5	5	1	1997
2021	Hydrogen Gas Getters	\$541,771	11	3	1.3	14	1	3	0	
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	\$685,041	8	3	1.5	10	5	5	0	
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	\$485,713	14	3	1.5	10	5	5	0	
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	\$510,700	12	2	1.3	14	1	3	1	1998
2047	Mercury Separation from Organic Liquids using SAMMs Technology	\$306,420	18	2	0.4	20	3	3	0	
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	\$548,713	10	2	3.3	1	1	2	1	1998

Table 5.2.1 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	\$662,498	9	2	3.3	1	1	2	1	1998
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	\$486,835	13	2	0.4	20	4	4	1	1998
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	\$266,551	20	1	3.3	1	4	4	1	1998
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	\$443,375	16	2	1.3	14	5	4	0	
2129	Development and Deployment for TRU Solutions	\$150,000	21	1	1.0	17	1	1	0	
2146	NDA of Boxes Containing TRU Waste	\$892,375	7	2	2.9	4	4	4	0	
2160	Kinetic Mixer	\$923,258	6	4	0.8	18	5	6	0	
2177	Mercury Wastes - >260ppm	\$272,025	19	2	1.9	8	3	5	0	
2233	Expert System Development for NDA Data Validation	\$1,861,906	4	4	1.5	10	5	5	1	1998
2309	Developmnet of CIF Stabilization Technologies	\$451,688	15	2	2.1	7	2	4	0	

Table 5.2.2 Projects for MWFA by investment score

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	\$4,267,439	1	7	1.5	10	5	6	1	1997
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	\$1,978,649	2	2	1.7	9	5	5	0	
1619	MIT Multi-Metal Emission Monitor	\$1,906,993	3	3	0.6	19	5	4	1	1998
2233	Expert System Development for NDA Data Validation	\$1,861,906	4	4	1.5	10	5	5	1	1998
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	\$1,713,687	5	3	2.9	4	5	4	1	1999
2160	Kinetic Mixer	\$923,258	6	4	0.8	18	5	6	0	
2146	NDA of Boxes Containing TRU Waste	\$892,375	7	2	2.9	4	4	4	0	
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	\$685,041	8	3	1.5	10	5	5	0	
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	\$662,498	9	2	3.3	1	1	2	1	1998
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	\$548,713	10	2	3.3	1	1	2	1	1998

Table 5.2.2 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2021	Hydrogen Gas Getters	\$541,771	11	3	1.3	14	1	3	0	
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	\$510,700	12	2	1.3	14	1	3	1	1998
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	\$486,835	13	2	0.4	20	4	4	1	1998
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	\$485,713	14	3	1.5	10	5	5	0	
2309	Developmnet of CIF Stabilization Technologies	\$451,688	15	2	2.1	7	2	4	0	
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	\$443,375	16	2	1.3	14	5	4	0	
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	\$354,669	17	2	2.5	6	5	5	1	1997
2047	Mercury Separation from Organic Liquids using SAMMs Technology	\$306,420	18	2	0.4	20	3	3	0	
2177	Mercury Wastes - >260ppm	\$272,025	19	2	1.9	8	3	5	0	
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	\$266,551	20	1	3.3	1	4	4	1	1998

Table 5.2.2 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2129	Development and Deployment for TRU Solutions	\$150,000	21	1	1.0	17	1	1	0	

Table 5.2.3 Projects for MWFA by relevance score

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	3.3	1	\$662,498	9	2	1	2	1	1998
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	3.3	1	\$548,713	10	2	1	2	1	1998
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	3.3	1	\$266,551	20	1	4	4	1	1998
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	2.9	4	\$1,713,687	5	3	5	4	1	1999
2146	NDA of Boxes Containing TRU Waste	2.9	4	\$892,375	7	2	4	4	0	
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	2.5	6	\$354,669	17	2	5	5	1	1997
2309	Developmnet of CIF Stabilization Technologies	2.1	7	\$451,688	15	2	2	4	0	
2177	Mercury Wastes - >260ppm	1.9	8	\$272,025	19	2	3	5	0	
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	1.7	9	\$1,978,649	2	2	5	5	0	
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	1.5	10	\$4,267,439	1	7	5	6	1	1997

Table 5.2.3 Continued

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
2233	Expert System Development for NDA Data Validation	1.5	10	\$1,861,906	4	4	5	5	1	1998
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	1.5	10	\$685,041	8	3	5	5	0	
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	1.5	10	\$485,713	14	3	5	5	0	
2021	Hydrogen Gas Getters	1.3	14	\$541,771	11	3	1	3	0	
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	1.3	14	\$510,700	12	2	1	3	1	1998
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	1.3	14	\$443,375	16	2	5	4	0	
2129	Development and Deployment for TRU Solutions	1.0	17	\$150,000	21	1	1	1	0	
2160	Kinetic Mixer	0.8	18	\$923,258	6	4	5	6	0	
1619	MIT Multi-Metal Emission Monitor	0.6	19	\$1,906,993	3	3	5	4	1	1998
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	0.4	20	\$486,835	13	2	4	4	1	1998

Table 5.2.3 Continued

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
2047	Mercury Separation from Organic Liquids using SAMMs Technology	0.4	20	\$306,420	18	2	3	3	0	

Table 5.2.4 Projects for MWFA by availability

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	5	\$4,267,439	1	7	1.5	10	6	1	1997
1619	MIT Multi-Metal Emission Monitor	5	\$1,906,993	3	3	0.6	19	4	1	1998
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	5	\$1,713,687	5	3	2.9	4	4	1	1999
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	5	\$1,978,649	2	2	1.7	9	5	0	
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	5	\$354,669	17	2	2.5	6	5	1	1997
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	5	\$685,041	8	3	1.5	10	5	0	
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	5	\$485,713	14	3	1.5	10	5	0	
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	5	\$443,375	16	2	1.3	14	4	0	
2160	Kinetic Mixer	5	\$923,258	6	4	0.8	18	6	0	
2233	Expert System Development for NDA Data Validation	5	\$1,861,906	4	4	1.5	10	5	1	1998

Table 5.2.4 Continued

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	4	\$486,835	13	2	0.4	20	4	1	1998
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	4	\$266,551	20	1	3.3	1	4	1	1998
2146	NDA of Boxes Containing TRU Waste	4	\$892,375	7	2	2.9	4	4	0	
2047	Mercury Separation from Organic Liquids using SAMMs Technology	3	\$306,420	18	2	0.4	20	3	0	
2177	Mercury Wastes - >260ppm	3	\$272,025	19	2	1.9	8	5	0	
2309	Developmnet of CIF Stabilization Technologies	2	\$451,688	15	2	2.1	7	4	0	
2021	Hydrogen Gas Getters	1	\$541,771	11	3	1.3	14	3	0	
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	1	\$510,700	12	2	1.3	14	3	1	1998
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	1	\$548,713	10	2	3.3	1	2	1	1998
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	1	\$662,498	9	2	3.3	1	2	1	1998

Table 5.2.4 Continued

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
2129	Development and Deployment for TRU Solutions	1	\$150,000	21	1	1.0	17	1	0	

Table 5.2.5 Projects for MWFA by highest gate achieved

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	6	\$4,267,439	1	7	1.5	10	5	1	1997
2160	Kinetic Mixer	6	\$923,258	6	4	0.8	18	5	0	
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	5	\$1,978,649	2	2	1.7	9	5	0	
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	5	\$354,669	17	2	2.5	6	5	1	1997
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	5	\$685,041	8	3	1.5	10	5	0	
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	5	\$485,713	14	3	1.5	10	5	0	
2177	Mercury Wastes - >260ppm	5	\$272,025	19	2	1.9	8	3	0	
2233	Expert System Development for NDA Data Validation	5	\$1,861,906	4	4	1.5	10	5	1	1998
1619	MIT Multi-Metal Emission Monitor	4	\$1,906,993	3	3	0.6	19	5	1	1998
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	4	\$1,713,687	5	3	2.9	4	5	1	1999

Table 5.2.5 Continued

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	4	\$486,835	13	2	0.4	20	4	1	1998
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	4	\$266,551	20	1	3.3	1	4	1	1998
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	4	\$443,375	16	2	1.3	14	5	0	
2146	NDA of Boxes Containing TRU Waste	4	\$892,375	7	2	2.9	4	4	0	
2309	Developmnet of CIF Stabilization Technologies	4	\$451,688	15	2	2.1	7	2	0	
2021	Hydrogen Gas Getters	3	\$541,771	11	3	1.3	14	1	0	
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	3	\$510,700	12	2	1.3	14	1	1	1998
2047	Mercury Separation from Organic Liquids using SAMMs Technology	3	\$306,420	18	2	0.4	20	3	0	
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	2	\$548,713	10	2	3.3	1	1	1	1998
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	2	\$662,498	9	2	3.3	1	1	1	1998

Table 5.2.5 Continued

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
2129	Development and Deployment for TRU Solutions	1	\$150,000	21	1	1.0	17	1	0	

Table 5.2.6 Projects for MWFA by number of years funded

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	7	\$4,267,439	1	1.5	10	5	6	1	1997
2233	Expert System Development for NDA Data Validation	4	\$1,861,906	4	1.5	10	5	5	1	1998
2160	Kinetic Mixer	4	\$923,258	6	0.8	18	5	6	0	
1619	MIT Multi-Metal Emission Monitor	3	\$1,906,993	3	0.6	19	5	4	1	1998
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	3	\$1,713,687	5	2.9	4	5	4	1	1999
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	3	\$685,041	8	1.5	10	5	5	0	
2021	Hydrogen Gas Getters	3	\$541,771	11	1.3	14	1	3	0	
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	3	\$485,713	14	1.5	10	5	5	0	
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	2	\$1,978,649	2	1.7	9	5	5	0	
2146	NDA of Boxes Containing TRU Waste	2	\$892,375	7	2.9	4	4	4	0	

Table 5.2.6 Continued

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	2	\$662,498	9	3.3	1	1	2	1	1998
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	2	\$548,713	10	3.3	1	1	2	1	1998
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	2	\$510,700	12	1.3	14	1	3	1	1998
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	2	\$486,835	13	0.4	20	4	4	1	1998
2309	Developmnet of CIF Stabilization Technologies	2	\$451,688	15	2.1	7	2	4	0	
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	2	\$443,375	16	1.3	14	5	4	0	
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	2	\$354,669	17	2.5	6	5	5	1	1997
2047	Mercury Separation from Organic Liquids using SAMMs Technology	2	\$306,420	18	0.4	20	3	3	0	
2177	Mercury Wastes - >260ppm	2	\$272,025	19	1.9	8	3	5	0	
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	1	\$266,551	20	3.3	1	4	4	1	1998

Table 5.2.6 Continued

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2129	Development and Deployment for TRU Solutions	1	\$150,000	21	1.0	17	1	1	0	

Table 5.2.7 Projects for MWFA by ASME review status

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
1675	Mercury Contamination - Amalgamate Mercury (contract with NFS and ADA)	0		\$1,978,649	2	2	1.7	9	5	5
2021	Hydrogen Gas Getters	0		\$541,771	11	3	1.3	14	1	3
2029	Multiple Metal Continuous Emissions Monitor (CEM) Evaluation at oak Ridge TSCA Incinerator	0		\$685,041	8	3	1.5	10	5	5
2037	Salt and Ash Stabilization - Stabilize Ash using Clemson's Sintering Process	0		\$485,713	14	3	1.5	10	5	5
2047	Mercury Separation from Organic Liquids using SAMMs Technology	0		\$306,420	18	2	0.4	20	3	3
2058	Mercury Contamination - Separate and Remove Mercury using Sorbent Process	0		\$443,375	16	2	1.3	14	5	4
2129	Development and Deployment for TRU Solutions	0		\$150,000	21	1	1.0	17	1	1
2146	NDA of Boxes Containing TRU Waste	0		\$892,375	7	2	2.9	4	4	4
2160	Kinetic Mixer	0		\$923,258	6	4	0.8	18	5	6
2177	Mercury Wastes - >260ppm	0		\$272,025	19	2	1.9	8	3	5

Table 5.2.7 Continued

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
2309	Developmnet of CIF Stabilization Technologies	0		\$451,688	15	2	2.1	7	2	4
1568	Nondestructive Waste Assay Using Combined Thermal Epithermal Neutron Interrogation	1	1997	\$4,267,439	1	7	1.5	10	5	6
1685	Stabilization of Salt Using Encapsulation with Polyester Resin	1	1997	\$354,669	17	2	2.5	6	5	5
1619	MIT Multi-Metal Emission Monitor	1	1998	\$1,906,993	3	3	0.6	19	5	4
2041	Mercury Contamination - Separate and Remove Mercury using Polymer Filtration	1	1998	\$510,700	12	2	1.3	14	1	3
2050	Characterization of Remote-Handled Waste Drums using High Speed Neutron Detectors	1	1998	\$548,713	10	2	3.3	1	1	2
2052	Characterization of Remote - Handled Waste Drums using Multi Detector Analysis System	1	1998	\$662,498	9	2	3.3	1	1	2
2053	Characterization of Remote-Handled Waste Drums using Gamma Spectrometry Combined with Acceptable Knowledge	1	1998	\$486,835	13	2	0.4	20	4	4
2056	Characterization of Remote-Handled Drums using Radio-Frequency Quadrupole (RFQ) Based Active Neutron Interrogation	1	1998	\$266,551	20	1	3.3	1	4	4
2233	Expert System Development for NDA Data Validation	1	1998	\$1,861,906	4	4	1.5	10	5	5

Table 5.2.7 Continued

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
1664	Mechanical Systems - Handling Material in Contact-handled Processes using HANDS-55 Systems	1	1999	\$1,713,687	5	3	2.9	4	5	4

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5.3 Nuclear Materials Focus Area

The Nuclear Materials Focus Area (formerly the Plutonium Focus Area) provides new or improved technologies for safe and effective long-term storage of nuclear materials including impure plutonium oxides, interim storage of stabilized plutonium residues pending disposition to WIPP, and safety surveillance for long-term plutonium and other long-lived nuclear material storage.

NMFA projects were excluded because that FA will not be fully operational until FY 2001.

5.4 Subsurface Contaminants Focus Area

The Subsurface Contaminant Focus Area provides new or improved technologies to address environmental problems associated with hazardous and radioactive contaminants in soil and groundwater. Emphasis is placed on the development of in situ technologies to minimize remediation costs and potential worker exposure, to improve landfill containment, and to implement effective and reliable subsurface barriers to contaminant migration.

Individual projects are identified by OST Tech ID and OST Tech Title. Table 5.4.1 in each section provides the scores and rankings for all projects within the FA. Table 5.4.2 ranks projects based on investment. Table 5.4.3 ranks projects based on relevance. Table 5.4.4 ranks projects based on availability. Table 5.4.5 sorts projects by gate status (i.e., the highest gate achieved). Table 5.4.6 sorts by the number of years that the project has been funded by DOE. And Table 5.4.7 sorts projects based on prior ASME peer review status.

Table 5.4.1 Screening metrics for SCFA projects

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
10	Alternative Landfill Cover	\$9,716,202	2	7	0.6	9	4	6	1	1997
123	In Situ Gaseous Reduction System	\$2,670,956	13	6	0.0	27	2	4	1	1999
15	In Situ Redox Manipulation	\$5,807,521	6	7	0.1	22	2	4	1	1997
1519	Hydrous Pyrolysis/Oxidation	\$4,888,041	8	5	0.9	3	5	2	1	1998
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	\$356,000	26	1	0.5	11	1	6	0	
162	Smart Sampling	\$2,123,719	15	7	0.3	15	5	6	0	
163	Remediation of DNAPLs in Low Permeability Soils	\$1,660,229	19	3	0.1	23	1	3	1	1998
167	In Situ Chemical Oxidation Using Potassium Permanganate	\$2,716,899	12	6	0.9	3	2	4	1	1998
1744	In Situ Stabilization and Retrieval System	\$5,905,390	5	5	1.1	2	2	6	0	
1773	Verification and Monitor System for Subsurface Barrier	\$569,947	25	2	0.7	6	1	3	0	
1863	Portable Selective Hot Spot Removal System	\$2,315,837	14	2	0.2	20	2	5	0	

Table 5.4.1 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	\$2,090,700	16	3	0.2	18	2	5	0	
2063	Geosyphon/Geoflow	\$1,065,619	21	3	0.1	23	2	4	1	1998
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	\$956,736	22	2	0.7	6	1	6	0	
2158	Segmented Gate System	\$3,378,148	11	2	1.2	1	1	6	0	
2188	Phytoremediation of Radiologically Contaminated Soils	\$671,869	23	3	0.1	23	2	6	0	
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	\$2,082,922	17	2	0.6	10	1	4	0	
237	Innovative DNAPL Characterization Technologies	\$1,864,908	18	4	0.4	13	2	4	0	
46	Passive Reactive Barrier	\$7,652,611	4	5	0.2	19	2	4	1	1998
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	\$335,500	27	2	0.2	20	1	-9999	0	
50	Viscous Liquid Barrier	\$9,640,433	3	7	0.3	16	2	4	1	1998
51	Frozen Soil Barrier	\$5,716,982	7	8	0.4	12	2	5	1	1998

Table 5.4.1 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
523	Barriers and Post-Closing Monitoring	\$3,749,949	10	4	0.4	13	4	4	0	
585	Verification of Subsurface Barriers/Moisture Detection	\$600,507	24	3	0.1	23	2	6	0	
59	In Situ Vitrification Bottoms-up	\$3,876,211	9	3	0.7	6	2	4	1	1998
7	Dynamic Underground Stripping	\$15,855,950	1	7	0.8	5	2	5	1	1998
8	Environmental Measurement While Drilling	\$1,228,069	20	5	0.3	16	2	6	0	

Table 5.4.2 Projects for SCFA by investment score

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
7	Dynamic Underground Stripping	\$15,855,950	1	7	0.8	5	2	5	1	1998
10	Alternative Landfill Cover	\$9,716,202	2	7	0.6	9	4	6	1	1997
50	Viscous Liquid Barrier	\$9,640,433	3	7	0.3	16	2	4	1	1998
46	Passive Reactive Barrier	\$7,652,611	4	5	0.2	19	2	4	1	1998
1744	In Situ Stabilization and Retrieval System	\$5,905,390	5	5	1.1	2	2	6	0	
15	In Situ Redox Manipulation	\$5,807,521	6	7	0.1	22	2	4	1	1997
51	Frozen Soil Barrier	\$5,716,982	7	8	0.4	12	2	5	1	1998
1519	Hydrous Pyrolysis/Oxidation	\$4,888,041	8	5	0.9	3	5	2	1	1998
59	In Situ Vitrification Bottoms-up	\$3,876,211	9	3	0.7	6	2	4	1	1998
523	Barriers and Post-Closing Monitoring	\$3,749,949	10	4	0.4	13	4	4	0	

Table 5.4.2 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2158	Segmented Gate System	\$3,378,148	11	2	1.2	1	1	6	0	
167	In Situ Chemical Oxidation Using Potassium Permanganate	\$2,716,899	12	6	0.9	3	2	4	1	1998
123	In Situ Gaseous Reduction System	\$2,670,956	13	6	0.0	27	2	4	1	1999
1863	Portable Selective Hot Spot Removal System	\$2,315,837	14	2	0.2	20	2	5	0	
162	Smart Sampling	\$2,123,719	15	7	0.3	15	5	6	0	
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	\$2,090,700	16	3	0.2	18	2	5	0	
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	\$2,082,922	17	2	0.6	10	1	4	0	
237	Innovative DNAPL Characterization Technologies	\$1,864,908	18	4	0.4	13	2	4	0	
163	Remediation of DNAPLs in Low Permeability Soils	\$1,660,229	19	3	0.1	23	1	3	1	1998
8	Environmental Measurement While Drilling	\$1,228,069	20	5	0.3	16	2	6	0	

Table 5.4.2 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2063	Geosyphon/Geoflow	\$1,065,619	21	3	0.1	23	2	4	1	1998
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	\$956,736	22	2	0.7	6	1	6	0	
2188	Phytoremediation of Radiologically Contaminated Soils	\$671,869	23	3	0.1	23	2	6	0	
585	Verification of Subsurface Barriers/Moisture Detection	\$600,507	24	3	0.1	23	2	6	0	
1773	Verification and Monitor System for Subsurface Barrier	\$569,947	25	2	0.7	6	1	3	0	
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	\$356,000	26	1	0.5	11	1	6	0	
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	\$335,500	27	2	0.2	20	1	-9999	0	

Table 5.4.3 Projects for SCFA by relevance score

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
2158	Segmented Gate System	1.2	1	\$3,378,148	11	2	1	6	0	
1744	In Situ Stabilization and Retrieval System	1.1	2	\$5,905,390	5	5	2	6	0	
1519	Hydrous Pyrolysis/Oxidation	0.9	3	\$4,888,041	8	5	5	2	1	1998
167	In Situ Chemical Oxidation Using Potassium Permanganate	0.9	3	\$2,716,899	12	6	2	4	1	1998
7	Dynamic Underground Stripping	0.8	5	\$15,855,950	1	7	2	5	1	1998
59	In Situ Vittrification Bottoms-up	0.7	6	\$3,876,211	9	3	2	4	1	1998
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	0.7	6	\$956,736	22	2	1	6	0	
1773	Verification and Monitor System for Subsurface Barrier	0.7	6	\$569,947	25	2	1	3	0	
10	Alternative Landfill Cover	0.6	9	\$9,716,202	2	7	4	6	1	1997
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	0.6	10	\$2,082,922	17	2	1	4	0	

Table 5.4.3 Continued

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	0.5	11	\$356,000	26	1	1	6	0	
51	Frozen Soil Barrier	0.4	12	\$5,716,982	7	8	2	5	1	1998
523	Barriers and Post-Closing Monitoring	0.4	13	\$3,749,949	10	4	4	4	0	
237	Innovative DNAPL Characterization Technologies	0.4	13	\$1,864,908	18	4	2	4	0	
162	Smart Sampling	0.3	15	\$2,123,719	15	7	5	6	0	
50	Viscous Liquid Barrier	0.3	16	\$9,640,433	3	7	2	4	1	1998
8	Environmental Measurement While Drilling	0.3	16	\$1,228,069	20	5	2	6	0	
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	0.2	18	\$2,090,700	16	3	2	5	0	
46	Passive Reactive Barrier	0.2	19	\$7,652,611	4	5	2	4	1	1998
1863	Portable Selective Hot Spot Removal System	0.2	20	\$2,315,837	14	2	2	5	0	

Table 5.4.3 Continued

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	0.2	20	\$335,500	27	2	1	-9999	0	
15	In Situ Redox Manipulation	0.1	22	\$5,807,521	6	7	2	4	1	1997
163	Remediation of DNAPLs in Low Permeability Soils	0.1	23	\$1,660,229	19	3	1	3	1	1998
2063	Geosyphon/Geoflow	0.1	23	\$1,065,619	21	3	2	4	1	1998
2188	Phytoremediation of Radiologically Contaminated Soils	0.1	23	\$671,869	23	3	2	6	0	
585	Verification of Subsurface Barriers/Moisture Detection	0.1	23	\$600,507	24	3	2	6	0	
123	In Situ Gaseous Reduction System	0.0	27	\$2,670,956	13	6	2	4	1	1999

Table 5.4.4 Projects for SCFA by availability

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
1519	Hydrous Pyrolysis/Oxidation	5	\$4,888,041	8	5	0.9	3	2	1	1998
162	Smart Sampling	5	\$2,123,719	15	7	0.3	15	6	0	
10	Alternative Landfill Cover	4	\$9,716,202	2	7	0.6	9	6	1	1997
523	Barriers and Post-Closing Monitoring	4	\$3,749,949	10	4	0.4	13	4	0	
123	In Situ Gaseous Reduction System	2	\$2,670,956	13	6	0.0	27	4	1	1999
15	In Situ Redox Manipulation	2	\$5,807,521	6	7	0.1	22	4	1	1997
167	In Situ Chemical Oxidation Using Potassium Permanganate	2	\$2,716,899	12	6	0.9	3	4	1	1998
1744	In Situ Stabilization and Retrieval System	2	\$5,905,390	5	5	1.1	2	6	0	
1863	Portable Selective Hot Spot Removal System	2	\$2,315,837	14	2	0.2	20	5	0	
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	2	\$2,090,700	16	3	0.2	18	5	0	

Table 5.4.4 Continued

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
2063	Geosyphon/Geoflow	2	\$1,065,619	21	3	0.1	23	4	1	1998
2188	Phytoremediation of Radiologically Contaminated Soils	2	\$671,869	23	3	0.1	23	6	0	
237	Innovative DNAPL Characterization Technologies	2	\$1,864,908	18	4	0.4	13	4	0	
46	Passive Reactive Barrier	2	\$7,652,611	4	5	0.2	19	4	1	1998
50	Viscous Liquid Barrier	2	\$9,640,433	3	7	0.3	16	4	1	1998
51	Frozen Soil Barrier	2	\$5,716,982	7	8	0.4	12	5	1	1998
585	Verification of Subsurface Barriers/Moisture Detection	2	\$600,507	24	3	0.1	23	6	0	
59	In Situ Vitrification Bottoms-up	2	\$3,876,211	9	3	0.7	6	4	1	1998
7	Dynamic Underground Stripping	2	\$15,855,950	1	7	0.8	5	5	1	1998
8	Environmental Measurement While Drilling	2	\$1,228,069	20	5	0.3	16	6	0	

Table 5.4.4 Continued

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	1	\$356,000	26	1	0.5	11	6	0	
163	Remediation of DNAPLs in Low Permeability Soils	1	\$1,660,229	19	3	0.1	23	3	1	1998
1773	Verification and Monitor System for Subsurface Barrier	1	\$569,947	25	2	0.7	6	3	0	
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	1	\$956,736	22	2	0.7	6	6	0	
2158	Segmented Gate System	1	\$3,378,148	11	2	1.2	1	6	0	
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	1	\$2,082,922	17	2	0.6	10	4	0	
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	1	\$335,500	27	2	0.2	20	-9999	0	

Table 5.4.5 Projects for SCFA by highest gate achieved

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
10	Alternative Landfill Cover	6	\$9,716,202	2	7	0.6	9	4	1	1997
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	6	\$356,000	26	1	0.5	11	1	0	
162	Smart Sampling	6	\$2,123,719	15	7	0.3	15	5	0	
1744	In Situ Stabilization and Retrieval System	6	\$5,905,390	5	5	1.1	2	2	0	
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	6	\$956,736	22	2	0.7	6	1	0	
2158	Segmented Gate System	6	\$3,378,148	11	2	1.2	1	1	0	
2188	Phytoremediation of Radiologically Contaminated Soils	6	\$671,869	23	3	0.1	23	2	0	
585	Verification of Subsurface Barriers/Moisture Detection	6	\$600,507	24	3	0.1	23	2	0	
8	Environmental Measurement While Drilling	6	\$1,228,069	20	5	0.3	16	2	0	
1863	Portable Selective Hot Spot Removal System	5	\$2,315,837	14	2	0.2	20	2	0	

Table 5.4.5 Continued

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	5	\$2,090,700	16	3	0.2	18	2	0	
51	Frozen Soil Barrier	5	\$5,716,982	7	8	0.4	12	2	1	1998
7	Dynamic Underground Stripping	5	\$15,855,950	1	7	0.8	5	2	1	1998
123	In Situ Gaseous Reduction System	4	\$2,670,956	13	6	0.0	27	2	1	1999
15	In Situ Redox Manipulation	4	\$5,807,521	6	7	0.1	22	2	1	1997
167	In Situ Chemical Oxidation Using Potassium Permanganate	4	\$2,716,899	12	6	0.9	3	2	1	1998
2063	Geosyphon/Geoflow	4	\$1,065,619	21	3	0.1	23	2	1	1998
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	4	\$2,082,922	17	2	0.6	10	1	0	
237	Innovative DNAPL Characterization Technologies	4	\$1,864,908	18	4	0.4	13	2	0	
46	Passive Reactive Barrier	4	\$7,652,611	4	5	0.2	19	2	1	1998

Table 5.4.5 Continued

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
50	Viscous Liquid Barrier	4	\$9,640,433	3	7	0.3	16	2	1	1998
523	Barriers and Post-Closing Monitoring	4	\$3,749,949	10	4	0.4	13	4	0	
59	In Situ Vitrification Bottoms-up	4	\$3,876,211	9	3	0.7	6	2	1	1998
163	Remediation of DNAPLs in Low Permeability Soils	3	\$1,660,229	19	3	0.1	23	1	1	1998
1773	Verification and Monitor System for Subsurface Barrier	3	\$569,947	25	2	0.7	6	1	0	
1519	Hydrous Pyrolysis/Oxidation	2	\$4,888,041	8	5	0.9	3	5	1	1998
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	-9999	\$335,500	27	2	0.2	20	1	0	

Table 5.4.6 Projects for SCFA by number of years funded

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
51	Frozen Soil Barrier	8	\$5,716,982	7	0.4	12	2	5	1	1998
7	Dynamic Underground Stripping	7	\$15,855,950	1	0.8	5	2	5	1	1998
10	Alternative Landfill Cover	7	\$9,716,202	2	0.6	9	4	6	1	1997
50	Viscous Liquid Barrier	7	\$9,640,433	3	0.3	16	2	4	1	1998
15	In Situ Redox Manipulation	7	\$5,807,521	6	0.1	22	2	4	1	1997
162	Smart Sampling	7	\$2,123,719	15	0.3	15	5	6	0	
167	In Situ Chemical Oxidation Using Potassium Permanganate	6	\$2,716,899	12	0.9	3	2	4	1	1998
123	In Situ Gaseous Reduction System	6	\$2,670,956	13	0.0	27	2	4	1	1999
46	Passive Reactive Barrier	5	\$7,652,611	4	0.2	19	2	4	1	1998
1744	In Situ Stabilization and Retrieval System	5	\$5,905,390	5	1.1	2	2	6	0	

Table 5.4.6 Continued

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
1519	Hydrous Pyrolysis/Oxidation	5	\$4,888,041	8	0.9	3	5	2	1	1998
8	Environmental Measurement While Drilling	5	\$1,228,069	20	0.3	16	2	6	0	
523	Barriers and Post-Closing Monitoring	4	\$3,749,949	10	0.4	13	4	4	0	
237	Innovative DNAPL Characterization Technologies	4	\$1,864,908	18	0.4	13	2	4	0	
59	In Situ Vitrification Bottoms-up	3	\$3,876,211	9	0.7	6	2	4	1	1998
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	3	\$2,090,700	16	0.2	18	2	5	0	
163	Remediation of DNAPLs in Low Permeability Soils	3	\$1,660,229	19	0.1	23	1	3	1	1998
2063	Geosyphon/Geoflow	3	\$1,065,619	21	0.1	23	2	4	1	1998
2188	Phytoremediation of Radiologically Contaminated Soils	3	\$671,869	23	0.1	23	2	6	0	
585	Verification of Subsurface Barriers/Moisture Detection	3	\$600,507	24	0.1	23	2	6	0	

Table 5.4.6 Continued

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2158	Segmented Gate System	2	\$3,378,148	11	1.2	1	1	6	0	
1863	Portable Selective Hot Spot Removal System	2	\$2,315,837	14	0.2	20	2	5	0	
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	2	\$2,082,922	17	0.6	10	1	4	0	
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	2	\$956,736	22	0.7	6	1	6	0	
1773	Verification and Monitor System for Subsurface Barrier	2	\$569,947	25	0.7	6	1	3	0	
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	2	\$335,500	27	0.2	20	1	-9999	0	
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	1	\$356,000	26	0.5	11	1	6	0	

Table 5.4.7 Projects for SCFA by ASME review status

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
1529	Composting of Soils/Sediments and Sludges Containing Toxic Organics Including High Energy Explosives	0		\$356,000	26	1	0.5	11	1	6
162	Smart Sampling	0		\$2,123,719	15	7	0.3	15	5	6
1744	In Situ Stabilization and Retrieval System	0		\$5,905,390	5	5	1.1	2	2	6
1773	Verification and Monitor System for Subsurface Barrier	0		\$569,947	25	2	0.7	6	1	3
1863	Portable Selective Hot Spot Removal System	0		\$2,315,837	14	2	0.2	20	2	5
2061	Surfactant-Enhanced Aquifer Remediation of PCE at Neutral Buoyancy	0		\$2,090,700	16	3	0.2	18	2	5
2157	Portable Hi-Purity Germanium Detectors for Delineating Contamination in Soils	0		\$956,736	22	2	0.7	6	1	6
2158	Segmented Gate System	0		\$3,378,148	11	2	1.2	1	1	6
2188	Phytoremediation of Radiologically Contaminated Soils	0		\$671,869	23	3	0.1	23	2	6
2190	In Situ Soil Flushing Technology for Mobilization, Extraction and Removal of Metals and Radionuclides	0		\$2,082,922	17	2	0.6	10	1	4

Table 5.4.7 Continued

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
237	Innovative DNAPL Characterization Technologies	0		\$1,864,908	18	4	0.4	13	2	4
499	Inverse Scattering Ground Penetrating Radar Imaging of Buried Objects	0		\$335,500	27	2	0.2	20	1	-9999
523	Barriers and Post-Closing Monitoring	0		\$3,749,949	10	4	0.4	13	4	4
585	Verification of Subsurface Barriers/Moisture Detection	0		\$600,507	24	3	0.1	23	2	6
8	Environmental Measurement While Drilling	0		\$1,228,069	20	5	0.3	16	2	6
10	Alternative Landfill Cover	1	1997	\$9,716,202	2	7	0.6	9	4	6
15	In Situ Redox Manipulation	1	1997	\$5,807,521	6	7	0.1	22	2	4
1519	Hydrous Pyrolysis/Oxidation	1	1998	\$4,888,041	8	5	0.9	3	5	2
163	Remediation of DNAPLs in Low Permeability Soils	1	1998	\$1,660,229	19	3	0.1	23	1	3
167	In Situ Chemical Oxidation Using Potassium Permanganate	1	1998	\$2,716,899	12	6	0.9	3	2	4

Table 5.4.7 Continued

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
2063	Geosyphon/Geoflow	1	1998	\$1,065,619	21	3	0.1	23	2	4
46	Passive Reactive Barrier	1	1998	\$7,652,611	4	5	0.2	19	2	4
50	Viscous Liquid Barrier	1	1998	\$9,640,433	3	7	0.3	16	2	4
51	Frozen Soil Barrier	1	1998	\$5,716,982	7	8	0.4	12	2	5
59	In Situ Vitrification Bottoms-up	1	1998	\$3,876,211	9	3	0.7	6	2	4
7	Dynamic Underground Stripping	1	1998	\$15,855,950	1	7	0.8	5	2	5
123	In Situ Gaseous Reduction System	1	1999	\$2,670,956	13	6	0.0	27	2	4

5.5 Tanks Focus Area

The Tanks Focus Area provides new or improved technologies to safely and efficiently remediate over 300 underground storage tanks that have been used to process and store more than 100 million gallons of high-level radioactive and hazardous chemical mixed waste. Research and development of technologies are aimed at enabling tank farm closure using safe and cost-efficient solutions that are publicly acceptable and meet site regulatory requirements.

Individual projects are identified by OST Tech ID and OST Tech Title. Table 5.5.1 in each section provides the scores and rankings for all projects within the FA. Table 5.5.2 ranks projects based on investment. Table 5.5.3 ranks projects based on relevance. Table 5.5.4 ranks projects based on availability. Table 5.5.5 sorts projects by gate status (i.e., the highest gate achieved). Table 5.5.6 sorts by the number of years that the project has been funded by DOE. And Table 5.5.7 sorts projects based on prior ASME peer review status.

Table 5.5.1 Screening metrics for TFA projects

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
1510	Pulsed-Air Mixer	\$2,873,042	10	4	0.7	8	5	5	0	
1511	AEA Fluidic Pulse Jet Mixer	\$2,283,478	12	3	1.0	2	5	5	0	
1985	Corrosion Probe	\$1,074,518	19	3	0.3	19	5	5	1	1998
1989	SaltCake Dissolution	\$853,375	20	2	0.6	12	5	5	1	1998
20	Out of Tank Evaporator	\$5,468,529	5	5	0.1	24	5	6	0	
2009	High Activity Waste Forms and Processes	\$2,326,570	11	3	0.7	9	5	4	0	
2011	In-Tank Waste Retrieval - Arm Based System	\$4,709,131	7	3	0.4	15	5	5	0	
2012	In-Tank Waste Retrieval - Vehicle Based System	\$4,209,131	9	3	0.4	15	5	5	0	
2091	Metal Filters for Waste Tank Ventilation	\$145,675	23	2	0.2	21	5	4	0	
2092	DWPF Melter Pouring Enhancements	\$1,696,615	15	2	0.2	20	5	4	0	
2094	Product Acceptance Testing	\$1,417,005	17	3	0.9	5	5	4	0	

Table 5.5.1 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2097	Heel Retrieval for SRS	\$2,043,905	13	2	0.8	7	5	6	0	
21	Cesium Removal Using Crystalline Silicotitanate	\$9,542,670	3	5	0.7	9	5	6	0	
2119	Nested Fixed Depth Fluidic Sampler	\$1,395,019	18	3	0.2	21	5	5	0	
2232	Flygt Mixer	\$1,619,923	16	2	1.0	2	5	6	0	
233	Sludge Washing	\$11,007,909	2	7	0.6	12	5	4	1	1998
2367	Pipe Unplugging	\$281,000	22	1	0.4	15	2	4	0	
2368	Multipoint Grout Injection	\$1,745,800	14	2	0.6	11	5	6	0	
2370	Russian Retrieval Technologies	\$840,000	21	1	1.0	2	5	6	0	
2383	Vitrification Expended Material Processing System	\$50,000	24	1	0.2	21	5	6	0	
347	TRUEX/SREX	\$9,469,551	4	10	0.4	15	5	4	1	1998
350	Crossflow Filtration	\$4,626,762	8	5	0.5	14	5	6	0	

Table 5.5.1 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
82	Low Activity Waste Forms	\$5,077,205	6	4	1.5	1	5	4	0	
85	Light Duty Utility Arm	\$27,621,911	1	8	0.8	6	5	6	0	

Table 5.5.2 Projects for TFA by investment score

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
85	Light Duty Utility Arm	\$27,621,911	1	8	0.8	6	5	6	0	
233	Sludge Washing	\$11,007,909	2	7	0.6	12	5	4	1	1998
21	Cesium Removal Using Crystalline Silicotitanate	\$9,542,670	3	5	0.7	9	5	6	0	
347	TRUEX/SREX	\$9,469,551	4	10	0.4	15	5	4	1	1998
20	Out of Tank Evaporator	\$5,468,529	5	5	0.1	24	5	6	0	
82	Low Activity Waste Forms	\$5,077,205	6	4	1.5	1	5	4	0	
2011	In-Tank Waste Retrieval - Arm Based System	\$4,709,131	7	3	0.4	15	5	5	0	
350	Crossflow Filtration	\$4,626,762	8	5	0.5	14	5	6	0	
2012	In-Tank Waste Retrieval - Vehicle Based System	\$4,209,131	9	3	0.4	15	5	5	0	
1510	Pulsed-Air Mixer	\$2,873,042	10	4	0.7	8	5	5	0	

Table 5.5.2 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2009	High Activity Waste Forms and Processes	\$2,326,570	11	3	0.7	9	5	4	0	
1511	AEA Fluidic Pulse Jet Mixer	\$2,283,478	12	3	1.0	2	5	5	0	
2097	Heel Retrieval for SRS	\$2,043,905	13	2	0.8	7	5	6	0	
2368	Multipoint Grout Injection	\$1,745,800	14	2	0.6	11	5	6	0	
2092	DWPF Melter Pouring Enhancements	\$1,696,615	15	2	0.2	20	5	4	0	
2232	Flygt Mixer	\$1,619,923	16	2	1.0	2	5	6	0	
2094	Product Acceptance Testing	\$1,417,005	17	3	0.9	5	5	4	0	
2119	Nested Fixed Depth Fluidic Sampler	\$1,395,019	18	3	0.2	21	5	5	0	
1985	Corrosion Probe	\$1,074,518	19	3	0.3	19	5	5	1	1998
1989	SaltCake Dissolution	\$853,375	20	2	0.6	12	5	5	1	1998

Table 5.5.2 Continued

OST Tech ID	OST Tech Title	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2370	Russian Retrieval Technologies	\$840,000	21	1	1.0	2	5	6	0	
2367	Pipe Unplugging	\$281,000	22	1	0.4	15	2	4	0	
2091	Metal Filters for Waste Tank Ventilation	\$145,675	23	2	0.2	21	5	4	0	
2383	Vitrification Expended Material Processing System	\$50,000	24	1	0.2	21	5	6	0	

Table 5.5.3 Projects for TFA by relevance score

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
82	Low Activity Waste Forms	1.5	1	\$5,077,205	6	4	5	4	0	
1511	AEA Fluidic Pulse Jet Mixer	1.0	2	\$2,283,478	12	3	5	5	0	
2232	Flygt Mixer	1.0	2	\$1,619,923	16	2	5	6	0	
2370	Russian Retrieval Technologies	1.0	2	\$840,000	21	1	5	6	0	
2094	Product Acceptance Testing	0.9	5	\$1,417,005	17	3	5	4	0	
85	Light Duty Utility Arm	0.8	6	\$27,621,911	1	8	5	6	0	
2097	Heel Retrieval for SRS	0.8	7	\$2,043,905	13	2	5	6	0	
1510	Pulsed-Air Mixer	0.7	8	\$2,873,042	10	4	5	5	0	
21	Cesium Removal Using Crystalline Silicotitanate	0.7	9	\$9,542,670	3	5	5	6	0	
2009	High Activity Waste Forms and Processes	0.7	9	\$2,326,570	11	3	5	4	0	

Table 5.5.3 Continued

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
2368	Multipoint Grout Injection	0.6	11	\$1,745,800	14	2	5	6	0	
233	Sludge Washing	0.6	12	\$11,007,909	2	7	5	4	1	1998
1989	SaltCake Dissolution	0.6	12	\$853,375	20	2	5	5	1	1998
350	Crossflow Filtration	0.5	14	\$4,626,762	8	5	5	6	0	
347	TRUEX/SREX	0.4	15	\$9,469,551	4	10	5	4	1	1998
2011	In-Tank Waste Retrieval - Arm Based System	0.4	15	\$4,709,131	7	3	5	5	0	
2012	In-Tank Waste Retrieval - Vehicle Based System	0.4	15	\$4,209,131	9	3	5	5	0	
2367	Pipe Unplugging	0.4	15	\$281,000	22	1	2	4	0	
1985	Corrosion Probe	0.3	19	\$1,074,518	19	3	5	5	1	1998
2092	DWPF Melter Pouring Enhancements	0.2	20	\$1,696,615	15	2	5	4	0	

Table 5.5.3 Continued

OST Tech ID	OST Tech Title	Relevance Score	Relevance Rank	Investment Score	Investment Rank	# of Years of Funding	Availability Score	Highest Gate	ASME Reviewed	Review Date
2119	Nested Fixed Depth Fluidic Sampler	0.2	21	\$1,395,019	18	3	5	5	0	
2091	Metal Filters for Waste Tank Ventilation	0.2	21	\$145,675	23	2	5	4	0	
2383	Vitrification Expended Material Processing System	0.2	21	\$50,000	24	1	5	6	0	
20	Out of Tank Evaporator	0.1	24	\$5,468,529	5	5	5	6	0	

Table 5.5.4 Projects for TFA by availability

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
1510	Pulsed-Air Mixer	5	\$2,873,042	10	4	0.7	8	5	0	
1511	AEA Fluidic Pulse Jet Mixer	5	\$2,283,478	12	3	1.0	2	5	0	
1985	Corrosion Probe	5	\$1,074,518	19	3	0.3	19	5	1	1998
1989	SaltCake Dissolution	5	\$853,375	20	2	0.6	12	5	1	1998
20	Out of Tank Evaporator	5	\$5,468,529	5	5	0.1	24	6	0	
2009	High Activity Waste Forms and Processes	5	\$2,326,570	11	3	0.7	9	4	0	
2011	In-Tank Waste Retrieval - Arm Based System	5	\$4,709,131	7	3	0.4	15	5	0	
2012	In-Tank Waste Retrieval - Vehicle Based System	5	\$4,209,131	9	3	0.4	15	5	0	
2091	Metal Filters for Waste Tank Ventilation	5	\$145,675	23	2	0.2	21	4	0	
2092	DWPF Melter Pouring Enhancements	5	\$1,696,615	15	2	0.2	20	4	0	

Table 5.5.4 Continued

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
2094	Product Acceptance Testing	5	\$1,417,005	17	3	0.9	5	4	0	
2097	Heel Retrieval for SRS	5	\$2,043,905	13	2	0.8	7	6	0	
21	Cesium Removal Using Crystalline Silicotitanate	5	\$9,542,670	3	5	0.7	9	6	0	
2119	Nested Fixed Depth Fluidic Sampler	5	\$1,395,019	18	3	0.2	21	5	0	
2232	Flygt Mixer	5	\$1,619,923	16	2	1.0	2	6	0	
233	Sludge Washing	5	\$11,007,909	2	7	0.6	12	4	1	1998
2368	Multipoint Grout Injection	5	\$1,745,800	14	2	0.6	11	6	0	
2370	Russian Retrieval Technologies	5	\$840,000	21	1	1.0	2	6	0	
2383	Vitrification Expended Material Processing System	5	\$50,000	24	1	0.2	21	6	0	
347	TRUEX/SREX	5	\$9,469,551	4	10	0.4	15	4	1	1998

Table 5.5.4 Continued

OST Tech ID	OST Tech Title	Availability Score	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Highest Gate	ASME Reviewed	Review Date
350	Crossflow Filtration	5	\$4,626,762	8	5	0.5	14	6	0	
82	Low Activity Waste Forms	5	\$5,077,205	6	4	1.5	1	4	0	
85	Light Duty Utility Arm	5	\$27,621,911	1	8	0.8	6	6	0	
2367	Pipe Unplugging	2	\$281,000	22	1	0.4	15	4	0	

Table 5.5.5 Projects for TFA by highest gate achieved

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
20	Out of Tank Evaporator	6	\$5,468,529	5	5	0.1	24	5	0	
2097	Heel Retrieval for SRS	6	\$2,043,905	13	2	0.8	7	5	0	
21	Cesium Removal Using Crystalline Silicotitanate	6	\$9,542,670	3	5	0.7	9	5	0	
2232	Flygt Mixer	6	\$1,619,923	16	2	1.0	2	5	0	
2368	Multipoint Grout Injection	6	\$1,745,800	14	2	0.6	11	5	0	
2370	Russian Retrieval Technologies	6	\$840,000	21	1	1.0	2	5	0	
2383	Vitrification Expended Material Processing System	6	\$50,000	24	1	0.2	21	5	0	
350	Crossflow Filtration	6	\$4,626,762	8	5	0.5	14	5	0	
85	Light Duty Utility Arm	6	\$27,621,911	1	8	0.8	6	5	0	
1510	Pulsed-Air Mixer	5	\$2,873,042	10	4	0.7	8	5	0	

Table 5.5.5 Continued

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
1511	AEA Fluidic Pulse Jet Mixer	5	\$2,283,478	12	3	1.0	2	5	0	
1985	Corrosion Probe	5	\$1,074,518	19	3	0.3	19	5	1	1998
1989	SaltCake Dissolution	5	\$853,375	20	2	0.6	12	5	1	1998
2011	In-Tank Waste Retrieval - Arm Based System	5	\$4,709,131	7	3	0.4	15	5	0	
2012	In-Tank Waste Retrieval - Vehicle Based System	5	\$4,209,131	9	3	0.4	15	5	0	
2119	Nested Fixed Depth Fluidic Sampler	5	\$1,395,019	18	3	0.2	21	5	0	
2009	High Activity Waste Forms and Processes	4	\$2,326,570	11	3	0.7	9	5	0	
2091	Metal Filters for Waste Tank Ventilation	4	\$145,675	23	2	0.2	21	5	0	
2092	DWPF Melter Pouring Enhancements	4	\$1,696,615	15	2	0.2	20	5	0	
2094	Product Acceptance Testing	4	\$1,417,005	17	3	0.9	5	5	0	

Table 5.5.5 Continued

OST Tech ID	OST Tech Title	Highest Gate	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	ASME Reviewed	Review Date
233	Sludge Washing	4	\$11,007,909	2	7	0.6	12	5	1	1998
2367	Pipe Unplugging	4	\$281,000	22	1	0.4	15	2	0	
347	TRUEX/SREX	4	\$9,469,551	4	10	0.4	15	5	1	1998
82	Low Activity Waste Forms	4	\$5,077,205	6	4	1.5	1	5	0	

Table 5.5.6 Projects for TFA by number of years funded

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
347	TRUEX/SREX	10	\$9,469,551	4	0.4	15	5	4	1	1998
85	Light Duty Utility Arm	8	\$27,621,911	1	0.8	6	5	6	0	
233	Sludge Washing	7	\$11,007,909	2	0.6	12	5	4	1	1998
21	Cesium Removal Using Crystalline Silicotitanate	5	\$9,542,670	3	0.7	9	5	6	0	
20	Out of Tank Evaporator	5	\$5,468,529	5	0.1	24	5	6	0	
350	Crossflow Filtration	5	\$4,626,762	8	0.5	14	5	6	0	
82	Low Activity Waste Forms	4	\$5,077,205	6	1.5	1	5	4	0	
1510	Pulsed-Air Mixer	4	\$2,873,042	10	0.7	8	5	5	0	
2011	In-Tank Waste Retrieval - Arm Based System	3	\$4,709,131	7	0.4	15	5	5	0	
2012	In-Tank Waste Retrieval - Vehicle Based System	3	\$4,209,131	9	0.4	15	5	5	0	

Table 5.5.6 Continued

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2009	High Activity Waste Forms and Processes	3	\$2,326,570	11	0.7	9	5	4	0	
1511	AEA Fluidic Pulse Jet Mixer	3	\$2,283,478	12	1.0	2	5	5	0	
2094	Product Acceptance Testing	3	\$1,417,005	17	0.9	5	5	4	0	
2119	Nested Fixed Depth Fluidic Sampler	3	\$1,395,019	18	0.2	21	5	5	0	
1985	Corrosion Probe	3	\$1,074,518	19	0.3	19	5	5	1	1998
2097	Heel Retrieval for SRS	2	\$2,043,905	13	0.8	7	5	6	0	
2368	Multipoint Grout Injection	2	\$1,745,800	14	0.6	11	5	6	0	
2092	DWPF Melter Pouring Enhancements	2	\$1,696,615	15	0.2	20	5	4	0	
2232	Flygt Mixer	2	\$1,619,923	16	1.0	2	5	6	0	
1989	SaltCake Dissolution	2	\$853,375	20	0.6	12	5	5	1	1998

Table 5.5.6 Continued

OST Tech ID	OST Tech Title	# of Years of Funding	Investment Score	Investment Rank	Relevance Score	Relevance Rank	Availability Score	Highest Gate	ASME Reviewed	Review Date
2091	Metal Filters for Waste Tank Ventilation	2	\$145,675	23	0.2	21	5	4	0	
2370	Russian Retrieval Technologies	1	\$840,000	21	1.0	2	5	6	0	
2367	Pipe Unplugging	1	\$281,000	22	0.4	15	2	4	0	
2383	Vitrification Expended Material Processing System	1	\$50,000	24	0.2	21	5	6	0	

Table 5.5.7 Projects for TFA by ASME review status

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
1510	Pulsed-Air Mixer	0		\$2,873,042	10	4	0.7	8	5	5
1511	AEA Fluidic Pulse Jet Mixer	0		\$2,283,478	12	3	1.0	2	5	5
20	Out of Tank Evaporator	0		\$5,468,529	5	5	0.1	24	5	6
2009	High Activity Waste Forms and Processes	0		\$2,326,570	11	3	0.7	9	5	4
2011	In-Tank Waste Retrieval - Arm Based System	0		\$4,709,131	7	3	0.4	15	5	5
2012	In-Tank Waste Retrieval - Vehicle Based System	0		\$4,209,131	9	3	0.4	15	5	5
2091	Metal Filters for Waste Tank Ventilation	0		\$145,675	23	2	0.2	21	5	4
2092	DWPF Melter Pouring Enhancements	0		\$1,696,615	15	2	0.2	20	5	4
2094	Product Acceptance Testing	0		\$1,417,005	17	3	0.9	5	5	4
2097	Heel Retrieval for SRS	0		\$2,043,905	13	2	0.8	7	5	6

Table 5.5.7 Continued

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
21	Cesium Removal Using Crystalline Silicotitanate	0		\$9,542,670	3	5	0.7	9	5	6
2119	Nested Fixed Depth Fluidic Sampler	0		\$1,395,019	18	3	0.2	21	5	5
2232	Flygt Mixer	0		\$1,619,923	16	2	1.0	2	5	6
2367	Pipe Unplugging	0		\$281,000	22	1	0.4	15	2	4
2368	Multipoint Grout Injection	0		\$1,745,800	14	2	0.6	11	5	6
2370	Russian Retrieval Technologies	0		\$840,000	21	1	1.0	2	5	6
2383	Vitrification Expended Material Processing System	0		\$50,000	24	1	0.2	21	5	6
350	Crossflow Filtration	0		\$4,626,762	8	5	0.5	14	5	6
82	Low Activity Waste Forms	0		\$5,077,205	6	4	1.5	1	5	4
85	Light Duty Utility Arm	0		\$27,621,911	1	8	0.8	6	5	6

Table 5.5.7 Continued

OST Tech ID	OST Tech Title	ASME Reviewed	Review Date	Investment Score	Investment Rank	# of Years of Funding	Relevance Score	Relevance Rank	Availability Score	Highest Gate
1985	Corrosion Probe	1	1998	\$1,074,518	19	3	0.3	19	5	5
1989	SaltCake Dissolution	1	1998	\$853,375	20	2	0.6	12	5	5
233	Sludge Washing	1	1998	\$11,007,909	2	7	0.6	12	5	4
347	TRUEX/SREX	1	1998	\$9,469,551	4	10	0.4	15	5	4

6.0 References

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Appendix

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